

# CHEMICAL MECHANICAL POLISHING WITH FRICTION-BASED CONTROL

## ABSTRACT

A chemical mechanical polishing apparatus has a polishing surface, a carrier head to  
5 press a substrate against the polishing surface with a controllable pressure, a motor to  
generate relative motion between the polishing surface and the carrier head at a velocity, and  
a controller. The controller is configured to vary at least one of the pressure and velocity in  
response to a signal that depends on the friction between the substrate and the polishing  
10 surface to maintain a constant torque, frictional force, or coefficient of friction.

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